

REMARKS

In the Official Action, the Examiner rejected claims 1-14 and 16-20. Reconsideration of the application is respectfully requested.

Rejections Under 35 U.S.C. § 103

The Examiner rejected claims 1-4, 6, 7, 9-14, and 16-20 under 35 U.S.C. § 103(a) as being unpatentable over Neu (U.S. Patent No. 5,404,255) in view of Chia (U.S. Patent No. 6,081,997). The Examiner's rejections are too lengthy to be efficiently reproduced in their entirety herein. However, with specific regard to independent claim 1, the Examiner stated:

Neu discloses an encapsulation molding equipment (col. 4, line 15 to col. 8, line 36 and fig. 6) comprising:

- A first support plate 27;
- A second support plate 53 proximately positioned with respect to the first support plate;
- A cavity plate 29 positioned between the first support plate and the second support plate, where the cavity plate 29 having an aperture 36 configured to accept only a protruding portion of the circuit package 33, where the aperture 36 is sized to create a peripheral void about only protruding portion of the circuit package 33 to permit a molding compound 60 to be disposed (fig. 9 and 10), but do not disclose the protruding portion of the circuit package contacts the first support plate 27. However, Chia et al. disclose an encapsulant injection system, where the protruding portion of the circuit package 12 contacts the first support plate 26 so that the encapsulant would not cover the chip (Chia fig. 1). Chia et al. teach the exposed I/O pads on the chip could be attached to a printed circuit board (Chia col. 1, lines 15-30). Therefore, it would have been obvious at the time the invention was made to modify Neu's device with the teaching of Chia et al. to have the protruding portion of the circuit package contacts the first support plate in order to attach the chip package to a printed circuit board.

Applicant respectfully traverses this rejection. The burden of establishing a *prima facie* case of obviousness falls on the Examiner. *Ex parte Wolters and Kuypers*, 214 U.S.P.Q. 735 (PTO Bd. App. 1979). Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention absent some teaching or suggestion support the combination or modification. *See ACS Hospital Systems, Inc. v. Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed. Cir. 1984). Accordingly, to establish a *prima facie* case, the Examiner must not only show that the combination or modification includes all of the claimed elements, but also present a convincing line of reasoning as to why one of ordinary skill in the art would have found the claimed invention to have been obvious in light of the teachings of the references. *See Ex parte Clapp*, 227 U.S.P.Q. 972 (B.P.A.I. 1985). When prior art references require a selected combination or modification to render obvious a subsequent invention, there must be some reason for the combination or modification other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination or modification. *See Uniroyal Inc. v. Rudkin-Wiley Corp.*, 837 F.2d 1044, 5 U.S.P.Q.2d 1434 (Fed. Cir. 1988).

The present application is directed to a system for molding a circuit package. More specifically, the present system facilitates the molding of a circuit package and produces a molded circuit package having an exposed die face. One of the disadvantages of prior systems is that they increase package height by encapsulating the entire package (page 2, lines 19-21). The presently claimed system adds no additional height to the top of the circuit package during the encapsulation process since the top surface of the die portion of the circuit package is only

encapsulated about its periphery, leaving the surface of the die exposed (page 4, lines 11-12). Not only does the present system alleviate the disadvantages associated with adding additional height to the circuit package during the encapsulation process, but by leaving the face of the die exposed, the present system provides a circuit package that advantageously dissipates heat rapidly (page 4, lines 11-13). To facilitate the encapsulation of the periphery of the die while maintaining exposure of the top surface, the *cavity plate is configured such that* the die surface is brought into contact *with the first support plate*, either directly or indirectly through a film. Either way, the configuration of the recited system provides a mechanism whereby the die surface is not encapsulated and therefore overall package height is not increased.

Accordingly, claim 1 recites a system for molding a circuit package comprising a first support plate, a second support plate, and a cavity plate. The cavity plate is positioned “between the first support plate and the second support plate.” Claim 1 further recites “the *cavity plate* having an aperture *configured ... such that* the protruding portion of the circuit package contacts the *first support plate*.” Still further, “the aperture is sized to create a peripheral void about only the protruding portion of the circuit package to permit a molding compound to be disposed thereabout.”

Conversely, the Neu reference discloses a molding system wherein a die is completely encapsulated during the molding process to encompass and cover the top surface of the die. While Neu contemplates facilitating different sizes and vertical dimensions (col. 5, lines 18-62), it is clear that Neu does not disclose a system for encapsulating an integrated circuit wherein the top surface of the die is left exposed after the encapsulation process. Because the molding

system disclosed by Neu is not implemented to encapsulate an integrated circuit wherein the top surface of the die is left exposed, the elements of the Neu molding system are different from those recited in the present claims, as discussed further below.

The Examiner characterized the cavity insert 29 as providing the cavity plate element recited in claim 1. As recognized by the Examiner, it is clear that the cavity insert 29 does not have “an aperture configured to accept only a protruding portion of the circuit package such that the protruding portion of the circuit package contacts the first support plate.” Further, contrary to the examiner’s assertion, it is clear that the cavity 36 is *not* “sized to create a *peripheral void* about *only* the protruding portion of the circuit package to permit a molding compound to be disposed thereabout.” The cavity 36, as disclosed in Neu, provides a void around both the periphery *and over the surface* of the chip 33 during the encapsulation process as evidenced by Fig. 6 and the accompanying description. Thus, it should be clear that the Neu reference does not disclose an aperture “sized to create a peripheral void about only the protruding portion of the circuit package as recited in claim 1.

The Chia reference relied upon by the Examiner does not obviate these deficiencies. In the Official Action, the Examiner stated that the Chia reference shows a “protruding portion of the circuit package 12 contacts the first support plate 26 so that the encapsulant would not cover the chip.” Chia discloses an encapsulant injection system having a first mold section 20 and a second mold section 26 having a cavity 28 dimensioned to receive a substrate 14 and attached to chip 12. Col. 6, lines 6-14. An upper wall *of the second mold section* 26 contacts the upper

surface of the chip 12. Col. 6, lines 16-18. At best, Chai discloses a support plate having a recess therein, wherein the recess permits contact between the die and the support plate.

In contrast, claim 1 recites a “cavity plate having an aperture configured...such that the protruding portion of the circuit package contacts *the first support plate*.” The Chia reference does not provide any cavity plate whatsoever, let alone one configured in a manner to provide contact between the circuit package *and the first support plate*. To be clear, the Chai reference discloses a plate having a recess configured to provide contact of a die to the upper surface of the same plate having the recess, *not* to provide contact of a die to a *different* plate as in the present claims. Thus, at best, any modification of Neu in view of Chia would provide a system wherein the upper platen member 10 of Neu would have a recessed area configured to receive the chip 33, not a modified cavity insert 29. Accordingly, the cited references either alone or in combination fail to disclose each of the recited elements.

Even if the Neu and Chia references taken in combination disclosed each of the recited elements, the Examiner’s assertion regarding the motivation to modify Neu in view of Chia is without merit. The Examiner asserted that the modification of Neu would have been obvious “in order to attach the chip package to a printed circuit board.” However, the apparatus disclosed by the Neu reference is already capable of attaching chip packages to a printed circuit board. The chips themselves are prefabricated on the strip surface and have leads extending therefrom. The chips are then encapsulated by the Neu apparatus, forming a chip package. Col. 5, lines 5-9. Because Neu already discloses a mechanism for attaching

chip packages to printed circuit boards (i.e., by the leads), the Examiner's assertion provides no valid motivation for modifying the Neu reference.

Furthermore, the cited references are not properly combinable in any circumstance. As can be appreciated by the Examiner, an obviousness rejection based upon modification of a reference that destroys the intent, purpose, or function of the invention disclosed in the reference is not proper, and a *prima facie* case of obviousness cannot be properly made. In short, there would be *no technological motivation* for engaging in the modification or change. To the contrary, there would be a disincentive. *In re Gordon*, 733 F.2d 900, 211 U.S.P.Q. 1125 (Fed. Cir. 1984). It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 U.S.P.Q. 769, 779 (Fed. Cir. 1983).

The Neu reference both teaches away from and would be rendered unsatisfactory by the modification proposed by the Examiner. As discussed above, the Neu reference is directed to equipment for the complete encapsulation of semiconductor chips. Col. 1, lines 11-16. The Neu reference cautions that an "extreme degree of care" must be taken to avoid handling the chips themselves. Col. 1, lines 35-37. Handling of the exposed chip can cause damage to the microcircuitry from static electricity or contaminants from a person's hands, causing the chip to become inoperable. Col. 1, lines 36-42. The purpose of the Neu reference is to provide an encapsulation mold for encapsulating semiconductor chips *within* a protective body to avoid these and other similar types of damage. Col. 2, lines 9-13. In the Official Action, the Examiner suggested that Neu could be modified to leave the face of the die exposed. This exposure, however, would be antithetical to the purpose of the Neu reference: i.e., protecting the die by

fully encapsulating it within a protective body. Modification in the manner suggested by the Examiner would prevent the apparatus from achieving this object of fully encapsulating the semiconductor chips, making it unsatisfactory for its intended purpose, and is directly contrary to the teaching of Neu. As such, any suggestion to modify the Neu reference as suggested by the Examiner cannot be supported.

Applicant respectfully submits that independent claim 1 is allowable for the reasons set forth above. Dependent claims 2-4, 6-7, 9-14, and 16-20 are believed to be allowable because of their dependency upon allowable base claim 1, in addition to the subject matter recited by each claim. Accordingly Applicant respectfully requests withdrawal of the Examiner's rejection and allowance of claims 1-4, 6, 7, 9-14 and 16-20.

Dependent claims 5 and 8 were also rejected by the Examiner under 35 U.S.C. § 103(a) as being unpatentable over Neu modified by Chia in further view of Miyajima (U.S. Patent No. 6,048,483). Miyajima does nothing to obviate the deficiencies of the Neu and Chia references discussed above. Accordingly, Applicant respectfully requests withdrawal of the Examiner's rejection and allowance of claims 5 and 8.

Conclusion

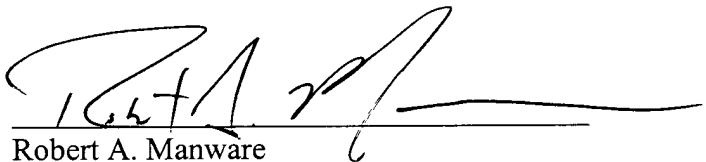
In view of the remarks and amendments set forth above, Applicant respectfully requests allowance of claims 1-14 and 16-20. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

General Authorization for Fee Payments and Extensions of Time

In accordance with 37 C.F.R. § 1.136, Applicant hereby provides a general authorization to treat this and any future reply requiring an extension of time as incorporating a request therefor. Furthermore, Applicant authorizes the Commissioner to charge the appropriate fee for any extension of time, and any additional fees which may be required, to Deposit Account No. 13-3092; Order No. MICS:0043 (99-0634).

Respectfully submitted,

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